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ABSTRACT

For the purpose of investigating instructional techniques that facilitate children's acquisition of reading comprehension skills in the middle and upper elementary grades, a 2-year inquiry into classroom instruction in reading comprehension was begun at the beginning of 1980. The initial focus of the study was on methods of assessment. Analytic inquiry focused on strategy differences between good and poor readers and remediation techniques for teaching comprehension skills beyond the word level. Following the analytic inquiry, a series of three empirical studies investigated an important but not widely studied aspect of reading skills development--children's perception of meaningful, intrasentence units in printed discourse. These studies found that (1) phrasally segmented text improved children's oral reading in regard to appropriate intonation, stress, and pauses; (2) both good and poor readers were able to use prosodic features in order to identify functional intrasentence units in speech, but poor readers had difficulty compensating for the lack of these organizing cues in printed text; and (3) oral modeling of text helped moderately poor readers to read out loud in a fluent manner, suggesting an improved understanding of text. These results suggest that auditory language skills should also be used as the basis for teaching children to analyze the phonological and structural organization of text on the larger level of phrases and sentences. (HOD)

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INQUIRY SUMMARY: CLASSROOM INSTRUCTION IN READING COMPREHENSION

David P. Snow

ABSTRACT

The inquiry, completed over a two year period, began with a study of methods for assessing reading comprehension. Analytic inquiry focused on (1) strategy differences between good and poor readers, and (2) remediation techniques for teaching comprehension skills beyond the word level. Following the analytic inquiry, a series of three empirical studies investigated an important but not widely studied aspect of reading skills development--children's perception of meaningful, intrasentence units in printed discourse. These studies found that (1) phrasally segmented text improved children's oral reading in regard to appropriate intonation, stress, and pauses; (2) both good and poor readers were able to use prosodic features in order to identify functional intrasentence units in speech, but poor readers had difficulty compensating for the lack of these organizing cues in printed text; and (3) oral modelling of text helped moderately poor readers to read out loud in a fluent manner, suggesting an improved understanding of the text. The instructional implications of these findings are discussed.

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INQUIRY SUMMARY: CLASSROOM INSTRUCTION IN READING COMPREHENSION

David P. Snow

At the beginning of FY 1980, Communication Skills staff initiated inquiry in "Classroom Instruction in Reading Comprehension" (funded under the NIE Special Relationship) for the purpose of investigating instructional techniques that facilitate children's acquisition of reading comprehension skills in the middle and upper elementary grades. The inquiry was motivated by the perception on the part of both researchers and regional educators that research in children's reading comprehension has suggested a number of insights that need to be explored more fully before their instructional implications can be assessed. The principal objective of the inquiry was to translate a small number of existing but tentative research findings into useful implications for classroom practice and to carry out analytic and empirical inquiry necessary to follow up the inferences.

This paper summarizes the activities and findings of the inquiry. It is divided into three sections (assessment, analytic inquiry, and empirical studies), which correspond to the major activities and chronological stages of the research.

Assessment of Reading Comprehension

The initial focus of the study was on methods of assessment. In experimental settings, the most widely used measure of discourse comprehension is free recall. In classroom settings, however, comprehension is usually assessed by asking children to respond to questions. It was desirable to identify forms of assessment that would be consistent

with the classroom experience of most children, that would be relatively easy to score and that would have the desirable characteristics ascribed to free recall.

This study of assessment (e.g., Snow, 1980) concentrated on the advantages and disadvantages of different comprehension tasks such as recognition measures, completion items, questions, cued recall, and free recall. One line of effort was to investigate the feasibility of using recognition measures or completion items as economical, valid alternatives to the use of free recall in classroom investigations.

A second line of effort was to establish a typology of comprehension subskills as formulated by researchers and educational practitioners. These skills represent the types of comprehension assessed during instruction in most classrooms. The typology of comprehension questions includes categories such as locating details, recognizing the main idea, and understanding cause-effect relationships, to name the most widely-used tasks. This typology specifies types of comprehension questions that would be consistent with classroom practice.

Our inquiry in assessment introduced an information-processing framework that was to guide our conceptualization of reading generally. Since this approach was based on assumptions which shaped our view of reading, a few remarks about it here are appropriate. An information-processing view of reading specifies that comprehension proceeds through a series of analytic stages involving different types of processing and distinct memory stores. The successive stages are devoted to the analysis of graphic, lexical, syntactic, and semantic features, as well as further associative levels of stimulus enrichment. This view distinguishes

between different levels of comprehension, corresponding to the psychological representation of the text that is produced at each stage of analysis. The relevance for assessment is that comprehension measures should reflect the degree to which readers have processed the text at a deep semantic level.

Under different experimental conditions, depth of processing can be expected to vary. Some task variables that were found to be important in this regard are 1) the relation between the wording of the text, the question, and the target answer, and 2) the height of target information in the content structure of the text (detail versus important information).

Relationship Between Text and Question

Comprehension questions require the reader to recall, recognize, or reconstruct information after reading a given passage. An important parameter of the task is the relation between the wording of the text, the wording of the question, and the target response. This relationship determines the level of processing required for the task because it specifies the cognitive contributions required of the reader. The simplest task demands are imposed by questions that call for information explicitly stated in the text. In this case, there is often a one-to-one (verbatim) relationship between the question, the text, and the target information. Such questions do not necessarily require a deep semantic processing of the text. They can be answered by a simpler process of matching surface features of the text with those of the question (or with the target answer, in a recognition measure). This is probably a major reason why many test items using a multiple-choice or cloze format are not very sensitive comprehension measures.

Comprehension measures can be improved by using tasks that relate to the abstract semantic representation of the text rather than to its literal or verbatim representation. Two types of tasks that have this abstract relationship with the text are a) questions (or recognition answers) that paraphrase the wording of the text, and b) those that call for information that was not explicitly stated in the text but must be inferentially derived by the reader. Since these tasks relate to the text on an abstract level of meaning but not on the level of surface representation, they can be answered only be recalling, recognizing, or inferring the target information in a semantic rather than surface form, that is, by understanding the underlying meaning expressed.

Important Versus Detailed Information

According to both theory and research (Kintsch & van Dijk, 1978; Meyer, 1975), text comprehension entails the psychological construction of a coherent, propositional representation of the text information, analogous to a text base.

In a coherent representation of the text, important information is preferentially stored in long-term memory, making it easier to recall. When readers understand a text, they recall higher-level information much better than information that is incidental to the main ideas. For this reason, the recall of important information (the gist of the text) is a better index of comprehension than the recall of less important information. If comprehension questions call for detailed (versus important) information, they may fail to show differences in comprehension that

actually exist across different task or text conditions. The implication for assessment is that questions should sample different levels of information in the content structure of the text.

This review shows why free recall is a good measure of comprehension: It does not involve a matching of superficial text features to questions, nor does it entail verbatim recall, and it samples the whole range of content levels. This suggests that recognition measures, or questions, could be improved 1) by using questions and answers that paraphrase the original text, and 2) by sampling from various levels of the content structure.

Analytic Inquiry

Our review of research in reading comprehension was reported in two papers. The first of these (Coots & Snow, 1980) investigated strategy differences between good and poor readers. Some research (e.g., Golinkoff, 1975-76) shows that poor readers lack organizational skills for written material. Instead of grouping words together in meaningful units (such as clauses and phrases), these readers tend to read in a word-by-word manner. Findings on the word recognition skills of poor readers suggest that poor readers are less efficient than good readers in using context-free decoding skills, as measured in time/accuracy scores.

Because poor readers appear deficient in both text organization and rapid decoding skills, some researchers have claimed that these skills are not only correlated but causally related. One way of describing this relationship is embodied in what has been called the decoding

sufficiency hypothesis (e.g., Fleisher, Jenkins, & Pany, 1979): Poor readers have difficulty with text organization (hence with comprehension) because they use up valuable memory resources in the exercise of inefficient decoding skills. In effect, this hypothesis states that poor readers need to devote so much time and conscious effort to the task of decoding words that they are unable to pay attention to the meaning of the text.

The decoding sufficiency hypothesis is of interest because, first, there is a considerable amount of evidence in support of it, and second, it is probably, in one form or another, the most widely accepted explanation of poor reading comprehension among researchers as well as teachers. It is also important as background for the next phase of our inquiry, which investigated causes of poor reading comprehension other than poor word-recognition skills. Although we do not doubt that inefficient decoding skill is the principal source of difficulty for many poor readers, we also note that there are sometimes more serious obstacles to children's acquisition of reading fluency than the problem of decoding from print to sound on the word level.

Weiner and Cromer (1967) presented a variety of models to account for poor reading comprehension. The two models most relevant to our work are the deficiency model and the difference model. According to the deficiency model, poor reading comprehension is due to the child's lack of some requisite skill such as vocabulary or decoding skills. The decoding sufficiency hypothesis is one form of this model. The difference model, however, claims that comprehension may suffer, not because of deficiencies in prerequisite skills, but because the reader uses a processing strategy that is not effective for the task. We described our

version of this idea as a "comprehension skills" approach. Our objective in further work was to clarify this concept and answer the questions: What processing strategies do poor readers lack? How can these be improved by instruction?

Our next paper (Coots & Snow, 1981) investigated these issues. We reviewed several studies that used remediation techniques focusing on comprehension skills (versus word-attack skills) as intervention strategies for children and adults who were poor readers. These techniques included the use of phrasally segmented text, imagery instructions, imitative reading, and cloze procedures. These techniques are designed to induce readers to group words together in meaningful units (phrasally segmented text), to process the text in a deep semantic way (imagery), to use syntactic and semantic cues in sentences (cloze procedures), or to use oral language as a model for sentence comprehension (imitative reading). All of these techniques seem to help students with their reading, at least in the confined circumstances of experimental investigations.

These studies showed two interesting findings. First, there were children who did not seem to use a strategy of reading for meaning, even though they possessed adequate oral language skills. Second, many of these children read better with specific instructions or cues that encouraged them to do so. Our initial inquiry did not attempt to explain why poor readers failed to spontaneously adopt a comprehension strategy in reading that they used effortlessly in listening. We sought to determine whether techniques focusing on phrasal and clausal units would improve

children's reading comprehension. We wished to strengthen the weak research support for the claim that instruction needs to address skills whose domain is beyond the single word.

Research Directions and Findings

Our research next pursued a particular aspect of text organization skills: children's perception and use of intrasentence junctures (e.g., phrases) in reading. The analysis of sentences into phrases and clauses (parsing) represents the first stage of organizing text beyond the word level. Thus, this seemed an appropriate place to concentrate our efforts. Basing our research on Cromer (1970), we hypothesized that some poor readers might have difficulty with the parsing and segmentation of sentences, but not with word recognition. If so, they should benefit from explicit text cues (such as a line break) that pre-organized the text in meaningful phrases (segmented text). Our working hypotheses were 1) There are poor readers in grades three and five who are characterized by the Difference model (good decoders-poor comprehenders). 2) Poor comprehenders can benefit from the cues given by segmented text.

The results of the study (Coots & Snow, 1982) failed to confirm the first of these hypotheses and provided only weak support for the second. First, we found little evidence for Difference readers in either grades three or five. That is, decoding skills and comprehension abilities were highly correlated. In fact, we found no clear instances of individual scores suggesting the good decoder-poor comprehender model. Second, segmented text facilitated comprehension for some groups of fifth graders, but not significantly.

However, the children's oral reading of differently segmented texts provided support for the hypothesis that poor readers fail to group words together into appropriate, meaningful units. The fifth graders' oral reading showed that many poor readers paused (and used other junctural features) at the ends of lines of print rather than at appropriate syntactic and semantic junctures. The prosodic features of their reading tended to be most accurate when they were reading phrasally segmented text in which lines of print corresponded to phrasal units. This suggested that poor readers were using the line boundary as the cue for suprasegmental units during oral reading, and perhaps for semantic units during comprehension. These results gave some encouraging evidence that segmented text could affect significant aspects of children's reading behavior, and that it might be a useful device for teaching children to group words together in meaningful units.

How could phrasal text be used to help poor readers? One factor, probably, is practice: Poor readers might benefit from phrasal text if they were introduced to it in instruction that lasted over an extended period of time and that used more complex and demanding texts. As part of our search for appropriate training factors, we were led to consider a more fundamental question: Why do poor readers have difficulty with sentence organization (parsing) in written material but not in spoken discourse? To answer this puzzling question, we turned to an analysis of the differences between listening and reading.

Differences Between Listening and Reading

In addition to the differences in lexical representation, the two modalities (listening and reading) differ in suprasegmental features. Intonation acoustically defines the organization of spoken sentences into information units or packages of syntactic-semantic content that correspond to the segmented units of phrasal text. Intonation is not consistently represented in written text. This difference between speech and writing is a potential stumbling block for children learning to read. Some children may have difficulty compensating for the lack of prosodic features in text. For this reason, they cannot easily organize complex printed material as required for reading comprehension.

Snow and Coots (1981) described evidence supporting the hypothesis that prosody assists listeners with the perceptual segmentation of sentences. Both psycholinguistic investigations and studies of speech production showed that speech is perceptually and acoustically segmented into units of an appropriate size and content for processing in short-term memory. These findings pointed to a relationship between speech prosody and the syntactic/semantic organization of sentences. Thus, it seemed likely that some poor readers might have difficulty with printed text because it does not contain some of the modality-bound cues (prosody) which they use in listening comprehension.

Our subsequent work followed the research of Kleiman, Winograd, and Humphrey (1979), who were also concerned about suprasegmental differences between speech and printed text and the implications of these differences for the young, beginning reader. Kleiman et al. found that poor readers could parse sentences (locate meaningful units) more

accurately when the text was supplemented by a spoken version of the target sentences. Based on their findings, Kleiman et al. argued that the absence of prosodic cues in text is the major source of reading difficulty for poor readers.

Our next study attempted to clarify some issues raised in the work reported by Kleiman et al. This study focused on the specific role of prosody in language comprehension by using a wider range of auditory input conditions and measures. The results (Snow, Coots, & Smith, 1982) extended previous findings by showing that children's parsing skills improved not only when there was an auditory input but also when the suprasegmental cues were slightly exaggerated. The study showed that children could clearly perceive prosodic signals in sentences and could use these cues in a task involving judgments of pause placement. Because this kind of task seems to reflect important sentence perception processes (Snow, 1982), the results suggested that suprasegmental cues play a key role in comprehension.* Most importantly, the study lent support to the hypothesis that poor readers rely on prosodic cues that are but poorly represented in written text (Kleiman et al., 1979; Schreiber & Read, 1980). Poor readers had difficulty in generating information signaled by prosody (such as finding meaningful units or locating permissible pause locations) when the material was presented in a graphic versus auditory form.

*However, a separate measure, using multiple-choice questions, failed to confirm any effects on comprehension.

The inquiry leading up to this study suggested that children do not have difficulty with sentence organization per se. While they have trouble with sentence organization during reading, they have no such difficulty in listening and speaking. What they need is instruction to help them transfer their oral language skills to reading. In particular, they need to recognize the relation between the prosodic organization of speech and the grouping of printed words into meaningful units.

One of the clearest instructional implications is that children might benefit both from phrasally segmented text and from the teacher's oral modelling of the text's prosodic features. The role of oral modelling, as a training strategy, was the focus of study in our next investigation. This study was a short training program for poor readers. The training consisted of about 45 minutes of special instruction per day over a five-day period of training. Two matched groups of poor readers participated. The training for both groups consisted of practice in reading segmented text, with instructions to pause slightly at each phrasal segment. The training also included feedback and choral reading.

The instructional presentations differed between groups only in respect to the presence or absence of oral modelling. The sound of phrasal text, with slight pauses and a distinct intonation contour, was extensively modelled by the teacher in one of the groups. In the other group, the instruction was identical except that the prosody was not modelled by the instructor. We hypothesized that oral modelling would be a significant feature of the effectiveness of instruction.

The effects of instruction were assessed by asking the children to read a passage of parsed text out loud before and after the training.

Adult judges listened to the taperecorded readings. Their task was to determine "which one of the readings took place under instructions to pause at appropriate intrasentence junctures" (even though no such instructions were actually given to the children; they were asked merely to read the phrasal text aloud as well as they could). The judges also gave confidence ratings for each judgment. The results showed that the judges were somewhat more accurate and much more confident in detecting the post-training reading of children in the modelling condition than in the no modelling condition.

The judges were only required to choose which one of two readings was given after the children had received instructions to pause at phrasal segments. Generally, this post-training reading was slower in pace and reflected prosodic features that were more appropriate to the meaning of the text. The results showed that children's oral reading behavior was affected by direct instruction in suprasegmental features of oral reading. That is, oral modelling helped poor readers to read with improved prosodic rendering of the text.

This study used segmented text, which contains explicit cues to the boundaries of phrasal intrasentence units. Thus, we do not know whether the instruction will generalize to standard (uncued) reading texts. The study showed only that oral modelling is a significant feature in teaching children to read parsed text with appropriate suprasegmental phonology.

Because of the general difficulty of measuring effects of instruction on comprehension, we did not attempt to measure the comprehension effects of the short-term instructional presentations that were used in this training study. Effects on oral reading behavior are, it seems, more

sensitive to instruction than are comprehension measures. However, it may be argued that effects of the former type imply the latter as well.

To summarize, Study 1 showed that phrasally segmented text improved children's oral reading and may have facilitated comprehension for some children. In Study 2, we found that children are sensitive to the organizing cues (prosody) of auditory input, as measured by a pause placement (parsing) task, but not a comprehension measure. Study 3 combined these findings by investigating the role of oral modelling in a training study using segmented text. Modelling significantly helped the children to improve their oral reading fluency. These studies are outlined in Table 1.

Table 1

Input Conditions, Measures, and Results for Three Studies in Reading Comprehension

	AUDIO INPUT		
TEXT SEGMENTATION	No Audio	Standard	Intoned
No print			2(C)
Paragraph	2(C)	2(C)	2(C)
Sentence	1(C), 1(O), 2(P)	2(P)*	2(P)*
Phrasal	1(C), 1(O)*, 3(O)		3(O)*

Key to Symbols

1 = Study 1, 2 = Study 2, etc.

C = comprehension questions, P = parsing task, O = oral reading measure

* = condition that facilitated reading performance on the measure indicated

Discussion

The research summarized in Table 1 shows that poor readers have difficulty with text units larger than single words. This is manifested not only in poor comprehension, but also in oral reading that shows an inappropriate suprasegmental grouping of words. Our observations, however, have led us to modify our preconception that all poor readers are word-by-word readers. In fact, there are many individual differences. Although some children (very poor readers) do read in this manner, the majority of children whom we observed imparted a good deal of prosodic interpretation to the text and read rather fluently. But they tended to rush pell mell through the text, paying little or no attention to punctuation and to grammatical units. In other words, the prosodic features of their oral reading did not correspond to the organizational units of semantic processing. It is as if they treated the object of reading as saying all the words correctly as quickly as possible.

Our research efforts are most relevant to this latter category of readers. The children's reading performance showed short-term improvements with the use of instructional aids such as segmented text, which encouraged them to group words together in meaningful units. The most important of these instructional variables seems to be oral modelling.

These results suggest a close link between listening and reading. Traditionally, teaching has stressed the correspondence between auditory and visual stimuli in teaching children decoding skills during the early to intermediate stages of reading instruction. Our research suggests that auditory language skills should also be used as the basis for teaching children to analyze the phonological and structural organization

of text on the larger level of phrases and sentences. Oral modelling of the text by the teacher gives the children information in auditory and visual channels. This type of exercise (simultaneous reading and listening) can help children to grasp the connection between the rich prosodic organization of speech and the less explicit organization of meaningful phrases and clauses in written text.

This paper began with a consideration of assessment in reading comprehension, and so it might be appropriate to close with some remarks on this difficult issue. Our research did not successfully demonstrate any consistent effects on comprehension that could be attributed to variables such as the modality of input or text format. Assessments consisting of multiple-choice questions were used to explore the usefulness of recognition measures in reading comprehension research. However, these measures were not successful in detecting comprehension effects in our studies, if the experimental variables did indeed affect comprehension. There are several possibilities to account for these results. First, it may be necessary to study in much more detail the types of questions, task requirements, and response modes that are necessary to measure subtle, short-term effects on comprehension. On the other hand, it may be that devices such as segmented text and procedures such as oral modelling do not appreciably enhance comprehension skills in the short-term, but may do so in the context of longer, carefully sequenced training programs.

The clearest implication for assessment that can be derived from our series of studies is that we should observe and assess children's oral reading performance with attention to miscues and prosodic features such as intonation, pauses, and stress. This is something that many teachers already do informally in the classroom. These features of oral reading reflect comprehension processes because they are dependent on the semantic representation of the text and not on its surface form. Since the modality-bound features of prosody provide an acoustic representation of syntactic-semantic structure, oral reading in the classroom can be useful for the needs of assessment as well as instruction.

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